

NONPROVISIONAL PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Attorney Docket No.: 105396

Date: February 8, 2000

BOX PATENT APPLICATION

**NONPROVISIONAL APPLICATION TRANSMITTAL
RULE §1.53(b)**

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Transmitted herewith for filing under 37 C.F.R. §1.53(b) is the nonprovisional patent application

For (Title): CONTACT PIECE

By (Inventors): Pierre LEHMANN

- ☒ Formal drawings (Figs. 1A-3B; 2 sheets) are attached.
- ☒ A Declaration and Power of Attorney is filed herewith.
- ☒ An assignment of the invention to PRECI-DIP DURTAL SA is filed herewith.
- ☐ An Information Disclosure Statement is filed herewith.
- ☒ A statement to establish small entity status under 37 C.F.R. §§1.9 and 1.27 is filed herewith.
- ☐ A Preliminary Amendment is filed herewith.
- ☐ Please amend the specification by inserting before the first line the sentence --This nonprovisional application claims the benefit of U.S. Provisional Application No. _____, filed _____--
- ☒ Priority of foreign application No. 99811102.5 filed November 30, 1999 in Europe is claimed (35 U.S.C. §119).
- ☐ A certified copy of the above corresponding foreign application is filed herewith.
- ☒ The filing fee is calculated below:

**CLAIMS IN THE APPLICATION AFTER ENTRY OF
ANY PRELIMINARY AMENDMENT NOTED ABOVE**

FOR:	NO. FILED	NO. EXTRA
BASIC FEE		
TOTAL CLAIMS	20 - 20	= 0
INDEP CLAIMS	1 - 3	= 0
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIMS PRESENTED		

* If the difference is less than zero, enter "0".

SMALL ENTITY

RATE	FEE
	\$ 345
x 9 =	\$ 0
x 39 =	\$ 0
+130 =	\$ 0
TOTAL	\$ 345

**OTHER THAN A
SMALL ENTITY**

RATE	FEE
	\$ 690
x 18	\$
x 78	\$
+260	\$
TOTAL	\$

- ☒ Check No. 106257 in the amount of \$345.00 to cover the filing fee is attached. Except as otherwise noted herein, the Commissioner is hereby authorized to charge any other fees that may be required to complete this filing, or to credit any overpayment, to Deposit Account No. 15-0461. Two duplicate copies of this sheet are attached.
- ☒ This application is entitled to small entity status. DO NOT charge large entity fees to our Deposit Account.

Respectfully submitted,

James A. Oliff

James A. Oliff
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Applicant or Patentee: Pierre LEHMANN
Application or Patent No:
Filed or Issued: February 8, 2000
For: Contact Piece

Attorney Docket No: 105396

**STATEMENT CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(F) and 1.27(c))- SMALL BUSINESS CONCERN**

the owner of the small business concern identified below:

☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN PRECI-DIP DURTAL SA
rue St. Maurice 34
2800 Delémont / Switzerland
ADDRESS OF CONCERN

The above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18 and reproduced in 37 CFR 1.9(d), for purpose of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purpose of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

Rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled: **Contact Piece**

by inventor (s)
described in

the specification filed herewith X
application No:
patent No:

, filed:
, issued

If the right held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

***NOTE:** Separate statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities (37 CFR 1.27)

FULL NAME

ADDRESS

INDIVIDUAL SMALL BUSINESS CONCERN NONPROFIT ORGANIZATION

FULL NAME

ADDRESS

INDIVIDUAL SMALL BUSINESS CONCERN NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate (37 CFR 1.28(b)).

TIPEWRITTEN NAME OF PERSON SIGNING
TIPEWRITTEN ADDRESS OF PERSON SIGNING

Serge MERILLAT
rue de l'Hôpital 12
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DATE

SIGNATURE



01.26.2000

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Country of Residence:: Switzerland
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State or Prov. of Residence::
Country of Residence::
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Name Suffix::
City of Residence::
State or Prov. of Residence::
Country of Residence::
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Name Suffix::
City of Residence::
State or Prov. of Residence::
Country of Residence::
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Country of Residence::

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Application Information

Title Line One:: Contact Piece
Title Line Two::
Title Line Three::
Title Line Four::

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2
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>This application is a::
Application One::
Filing Date::
Patent Number::
which is a::
>>Application Two::
Filing Date::
Patent Number::
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Foreign Application One::      99811102.5
Filing Date::                November 30, 1999
Country::                    Europe
Priority Claimed::            yes
Foreign Application Two::
Filing Date::
Country::
Priority Claimed::
Foreign Application Three::
Filing Date::
Country::
Priority Claimed::
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Contact piece

The content of Application No 99811102.5, filed November 30, 1999 in Europe, is hereby incorporated by reference.

5 The present invention concerns a contact piece of the female type usable in a connector, for example a connector answering the MIL norm or any other specification, or for any other application, such as for example in an integrated circuit base, or destined to be placed on a printed circuit board. The invention concerns more particularly the portion of this contact piece destined to accommodate the corresponding element of the male type.
10

Several specifications or norms, notably the MIL norms and in particular the MIL-C 39029 norm, define a certain number of characteristics which this portion of the contact piece must comply with, for example contact resistance, engagement and separation force of the male contact piece, depth of engagement of the male piece before contact is established etc. According to these norms, these various parameters are to be measured both when the pieces are new as well as after multiple uses, and this under very diverse environmental, temperature, humidity and other conditions.
15

20 In order to attempt to comply with these requirements, manufacturers have proposed various constructions of this portion of the contact piece.

Several known embodiments of such portions of contact pieces will be described further below, in connection with figures 1A and 1B as well as figure 2 ; these embodiments encounter notably the following disadvantages according to the constructions described : need to work the entire contact piece in a costly metallic alloy since it must have excellent electrical conduction properties as well as excellent mechanical properties, notably spring power, need to heat treat at least several portions of the piece in order to give it the necessary mechanical characteristics, need to
25
30

cover the whole piece, or an important portion thereof, with costly plating, of gold or silver, in order to give it the necessary electrical characteristics, difficulty to comply with certain norm requirements, notably MIL norms, lack of any possibility of interchanging the different elements of the
5 contact piece, etc.

A purpose of the present invention is thus to propose a contact piece comprising notably a female portion destined to accommodate a corresponding male portion, of improved construction relatively to the known contact pieces, so as to avoid the aforementioned inconveniences of
10 these contact pieces.

To achieve this purpose, a contact piece is proposed as described in the independent claim, particular embodiments or variants being described in the dependent claims. The last claims indicate more precisely some possible uses of such a contact piece.

15 The invention will be described in detail below, this description, which further includes certain advantages of the invention, making reference to the attached drawing comprising the figures, in which:

Figures 1A, 1B and 1C represent a portion of a contact piece according to a prior art construction, seen in partial longitudinal section, in
20 elevational projection and in cross section, respectively,

Figure 2 represents a portion of a contact piece according to another prior art construction, seen in partial longitudinal section, and

Figures 3A and 3B represent a portion of a contact piece according to a preferred embodiment of the invention, seen in partial
25 longitudinal section and in elevational projection, respectively.

In the following description as well as in all the figures, only the female type portion of the contact piece 1, destined to accommodate a corresponding male type element, will be mentioned or represented. This

male element is constituted of a pin, its mating end being hemispherical or shaped like a truncated cone, and having a determined diameter. This male element can be the male portion of a corresponding contact piece or else a pin of an integrated circuit or even a connecting part of an electronic component etc. The other portion of the contact piece 1, not described or represented here, can be of any known type for this kind of contact piece and can comprise for example a portion in which a wire can be crimped, screwed or soldered, or a fastening portion on a connector or printed circuit board or a second female type portion to constitute a transition contact piece, etc.

According to the simplest embodiment known, the portion of the contact piece which is of interest here is constituted of an axial bore of one of the contact piece's extremities, followed by the making of radial slits on a portion of the length of the tubular portion realized by the bore, so as to form elastic tongues or fingers. These fingers are then pressed together so as to form an elastic clamp. This construction has many inconveniences, namely a risk of permanent deformation of one or many of the fingers in the case of the askew engagement of a male element or the engagement of a male element of too big a diameter. Furthermore, although the contact piece is constituted of only one piece, it is costly as the necessary material must have the electrical and mechanical properties required for its functioning.

A first improvement made to the above contact piece consists in covering the portion in question with a bushing, as seen in figures 1A, 1B and 1C. One can see in these figures the contact piece 1, constituted essentially of a metallic pin of which one end, visible in the figure, is destined to accommodate a male element, not visible in the figures. The other end of the contact piece, not visible in the figures, is worked in a conventional manner to fulfil any known function of such a contact piece. It can be seen that the portion of the contact piece 1 which is of interest here has been bored axially, so as to build a lodging 10 in which the male element will come to be lodged. Slits 11, three in the embodiment represented here, have been shaped in order to separate three fingers 12.

The free extremities 120 of these three fingers 12 are then pressed together, by permanent deformation, so as to close slightly the clamp formed by the three fingers, as can be seen in the figures. As described so far, this construction represents the first embodiment described previously.

5 In order to prevent too strong an opening movement of the fingers 12, this portion of the contact piece is provided with a tube-shaped bushing 2, affixed by crimping or any other means onto the portion of the contact piece 1 behind the fingers 12. This bushing 2 abuts against the external surfaces of the fingers 12, preventing these from being moved apart too
10 much.

The extremity of bushing 2 facing the opening of lodging 10 comprises an end side 20 provided with a traversing opening 21 coaxial to the longitudinal axis of contact piece 1, respectively of lodging 10. The diameter of this opening 21 is determined so as to let pass only a male
15 element of a diameter inferior to that of a male element which would flatten the fingers 12 against the bushing 2.

The hole 21, coaxial to the longitudinal axis of the lodging 10 further serves as guiding means of the male element when mating.

20 Although this latter construction limits the risk of deformation of the fingers 12 when a male element having too wide a diameter or being not aligned is engaged, the pressure applied by the bushing 2 on the fingers 12 when these are apart, notably on the rear portion of these fingers, means that the latter no longer work fully elastically, which in particular decreases the electric conducting qualities of the contact, notably
25 in case of vibrations.

The inconvenience of machining the fingers 12 and the rest of the contact piece 1 from a single rough piece, i.e. of the same material, remains and results in a costly contact piece. For the same reasons, it is difficult and/or expensive to shape the extremities 120 of the fingers so
30 that they become rounded for an easier mating of the male element ; a slightly askew engagement of the male element relative to the longitudinal

axis of the lodging 10 can result in the male element being brought to bear against the extremity 120 of a finger, leading this finger to be bent towards the inside of lodging 10, i.e. to the contact piece being destroyed.

Figure 2 shows a construction proposed to remedy these last
5 flaws.

As previously, one has a contact piece 1 whose extremity that is of interest here is provided with an axial bore forming a lodging 10 for the male element to be accommodated. A contact clip 3 is inserted inside lodging 10. The contact clip 3 is formed from a metallic band, of a width
10 corresponding to the length of the clip, which is embossed so as to form a lateral strip fitted with several fingers of an essentially trapezoidal shape, projecting on one of the sides of the lateral strip, the larger bases of each finger being adjacent to the lateral strip whereas the small bases are free. The strip is divided in portions, each comprising several trapezoidal fingers
15 of the length of the portion corresponding to the interior perimeter of the lodging 10. The portion of strip is then coiled, the fingers being then pressed together by their extremities so as to deform them and decrease the inscribed diameter between the free extremities of the fingers. The clip 3 thus formed is inserted in the lodging 10, the free extremities of the
20 fingers 30 being directed towards the bottom of lodging 10 ; the portion 31 of clip 3, formed by the aforementioned lateral strip, is maintained towards the open extremity of lodging 10 by any known means, insertion, crimping or other.

According to this construction, only clip 3 must be made of an
25 alloy having excellent conductive qualities as well as excellent mechanical qualities of spring power. Therefore, the rest of contact piece 1 can be worked in a cheaper metal or alloy, for example brass. The clip 3 will be constituted preferably of a bronze/beryllium alloy or other.

During the mating of a male element, the fingers 30 move apart
30 in order to clamp said male element. The moving apart of the fingers 30 is

also restricted here by the inner surface of the lodging 10, with the same inconveniences as mentioned above.

Another inconvenience of this construction is that, in view of the low value of the angle α relative to the longitudinal axis formed by the fingers 30 pressed together, relative to the longitudinal axis of the lodging 10, the length at which it is necessary to engage the male element into the lodging 10 before its extremity comes into contact with the fingers 30 is important. Increasing this angle in order to diminish this distance could lead to the fingers 30 buttressing against the male element when the latter is withdrawn, thus causing it to be spoiled.

All the inconveniences mentioned previously in relation to the known constructions of the prior art are remedied by the construction according to the invention, of which a preferred embodiment is represented in figures 3A and 3B.

As previously, one has a contact piece 1 whose extremity destined to accommodate the male element is bored longitudinally so as to form a lodging 10 for accommodating the male element. The open extremity of lodging 10 comprises a first inner cylindrical neck 100, whose interior diameter is superior to that of lodging 10, followed by a second inner cylindrical neck 101 whose inner diameter is comprised between that of neck 100 and that of the bottom of lodging 10.

A contact clip 4 is inserted by the open extremity of lodging 10, so that its cylindrical portion 40 comes to be positioned on the inner cylindrical neck 101.

The clip 4 is obtained preferably in a manner rather similar to that which has been described previously for clip 3. A complementary arching operation towards the outside of the fingers' extremities is conducted when the clips are always assembled in a continuous strip. As an alternative to the trapezoidally shaped lamellae described, one can also

have lamellae of a rectangular shape and separation slits of a trapezoidal shape.

The clip 4 is fastened, by pressing in, crimping or any other known means on this inner neck 101. Unlike what has been described
 5 above in connection with clip 3, the contact fingers 41 of clip 4 have their free extremities 410 facing the opening of lodging 10. Furthermore, these free extremities 410, for each of the fingers 41, are formed so as to present an arched end portion 411, the free extremity directed towards the exterior being moved away from the longitudinal axis of lodging 10. This device is
 10 completed by an external bushing 5 pressed on and fastened on an outer cylindrical neck 102 of the contact piece 1. The extremity of bushing 5 facing the opening of lodging 10 comprises an end side 50 provided with a traversing opening 51 coaxial with the longitudinal axis of the contact piece 1, respectively of lodging 10. The diameter of this opening 51 is
 15 determined so as to let pass only a male element of a diameter acceptable by the contact clip 4. It can further be seen in the figure that if a male element has been engaged into clip 4, its diameter being lower than the diameter of opening 51, the moving apart of the fingers 41 of clip 4 is never restricted by the inner diameter of neck 100, since it is superior to
 20 that of neck 101, nor by the inner diameter of bushing 5, since it is greater than that of neck 101, nor by the inner diameter of bushing 5, since the latter is dimensioned so as to allow the fingers 41 to move away to a maximum. Thus, for a determined diameter, respectively gauge, of a male element, the corresponding female contact piece comprises a contact clip 4
 25 whose fingers 41 are subjected to an exclusively elastic deformation, on their whole length and on their whole range of deformation, the diameter limitation of the male element being determined by the calibrated opening 51 of the bushing 5. This operating method in elastic mode ensures a maximum electrical conductivity of the contact, even in case of vibrations.

30 The angle α of each finger relative to the longitudinal axis is also small ; this angle is typically comprised between 4° and 10° , being preferably comprised between 6° and 8° . In view of the arched portion 411

of the fingers 41, the male element cannot be buttressed when engaged or withdrawn from the fingers 41.

Another advantage of the presence of the arched portion is that the fingers 41 thus offer a greater contact surface with the male element, decreasing consequently the contact resistance between the female contact piece and the male contact piece.

Another advantage of this arched portion is a better transmission of the mechanical power between the male element and the clip, notably in the presence of vibrations. A spoiling of the contact surface of the male element in case of vibrations has namely been observed when the extremities of the contact fingers present an edge rather than a rounding as described for this embodiment.

Another advantage of this device is that the length of engagement of the male element before a contact is established is short since the male element meets first the portion of small diameter of the clip 4 formed by the fingers 41 pressed together.

Yet another advantage of this device is that the opening 51, aligned with the free extremities 410 of the fingers 41 forms a two point guiding means of the mating male element, thus preventing it from engaging askew.

The presence of the bushing 5 over the region of the contact piece 1 where the clip 4 is inserted and fastened ensures a mechanical reinforcement of the latter region by banding, respectively a better fastening of clip 4.

Tests have shown that when a male element mates with a female contact piece as represented in figure 2, either with a contact clip with the free extremities of the fingers facing the bottom of lodging 10, one has first a power peak as soon as the contact between the male element and the fingers is established, followed by an approximately constant force of

lower value. On the other hand, when a male element engages in a contact piece according to the invention, one has a constant engagement force of low value, without the initial peak. The engaging movement of the male element in the female element is therefore much smoother, thus sparing
5 the state of the male element's surface and reducing the risk of breakage of the male element, notably in the case of a pin of an integrated circuit which must be inserted into a base.

The separate manufacture of the clip and of the rest of the contact piece has many advantages, such as optimizing the choice of
10 material for one or the other components according to the requirements, heat and/or surface treatment adapted for each element, separate management of the stocks of clips and of connecting pieces according to different types, for fastening on connectors, on integrated circuit bases or on printed circuits etc., these different qualities bringing about an overall
15 decrease in the production costs.

The contact piece 1, with the exception of clip 4, will be manufactured in a low-cost metal or alloy, for example brass or more particularly brass able to bear the crimping of a conductor in the portion of the contact piece 1 opposite that described in detail here above. The clip 4
20 will be manufactured preferably in an alloy of bronze and beryllium.

Claims

1. Contact piece comprising at least a portion bearing an end of the female type, destined to accommodate a corresponding element of male type in a lodging disposed axially in said portion, said lodging including a contact clip intended to ensure the electrical contact between said male element and the contact piece,
- 5
- wherein
- 10
- said contact clip is provided with a plurality of elastic contact fingers fastened to an annular crown fitted in the inside of said lodging, each finger comprising a free extremity directed towards the opening of said lodging.
- 15
2. Contact piece according to claim 1, wherein each of said fingers is inclined by an angle α relative to the longitudinal axis of said lodging.
3. Contact piece according to claim 2, wherein the angle α is comprised between 4° and 10° .
- 20
4. Contact piece according to claim 3, wherein the angle α is comprised between 6° and 8° .
5. Contact piece according to claim 1, wherein each finger comprises an arched portion near its free extremity, the edge of said free extremity moving away from the longitudinal axis of said housing.
- 25
6. Contact piece according to claim 1, wherein it further comprises an essentially tube-shaped bushing encircling the portion of the contact piece fitted with said contact clip, said bushing being provided with a front side

comprising a passage opening coaxial to the longitudinal axis of the lodging.

- 5
7. Contact piece according to claim 6, wherein the bushing comprises a cylindrical rear portion fastened on a corresponding cylindrical neck of said contact piece.
- 10
8. Contact piece according to claim 6, wherein the passage opening has a diameter which allows a male element with a diameter equal or inferior to a determined diameter to engage and prevents a male element with a diameter greater than a determined diameter to engage in said portion of the contact piece of female type.
- 15
9. Contact piece according to claim 8, wherein the diameter of said lodging in its portion encircling said fingers is greater than the diameter circumscribed by said fingers when these are moved apart by a male element having said determined diameter has been mated in said contact piece.
- 20
10. Contact piece according to claim 8, wherein when a male element having said determined diameter or an inferior diameter is engaged between the fingers of the contact clip, no portion of the contact piece or of the bushing limits the moving apart of said fingers.
- 25
11. Contact piece according to claim 8, wherein when a male element having said determined diameter or an inferior diameter is engaged between the fingers of the contact clip, the moving apart of said fingers is an elastic movement.
12. Contact piece according to claim 8, wherein said passage opening and the arched portions of the elastic fingers

constitute a guiding means of the male element during mating.

13. Contact piece according to claim 1, wherein said contact piece and the clip are manufactured in different materials.

14. Contact piece according to claim 13, wherein the contact piece is of brass.

15. Contact piece according to claim 14, wherein the contact piece is of a brass alloy able to bear crimping.

16. Contact piece according to claim 13, wherein the clip is of an alloy of bronze and beryllium.

17. Contact piece according to claim 1, wherein it complies with the norm MIL-C 39029.

18. Connector fitted with at least one contact piece according to claim 1.

19. Component base fitted with at least one contact piece according to claim 1.

20. Printed circuit board fitted with at least one contact piece according to claim 1.

Abstract

The contact piece (1) comprises a portion of female type able to accommodate a corresponding portion of male type. This female type portion includes a contact clip (4) provided with elastic fingers (42) oriented towards the opening of a lodging (10) destined to accommodate said male type portion. The piece is completed with a bushing (5) encircling the clip and provided with a front side (50) comprising a passage opening (51) serving as gauge, accepting or refusing the passage of a male portion according to its diameter.

In this manner, the elastic fingers (42) always operate in an elastic mode and never suffer a permanent deformation. Such a disposition has many other advantages.

(fig. 3A)

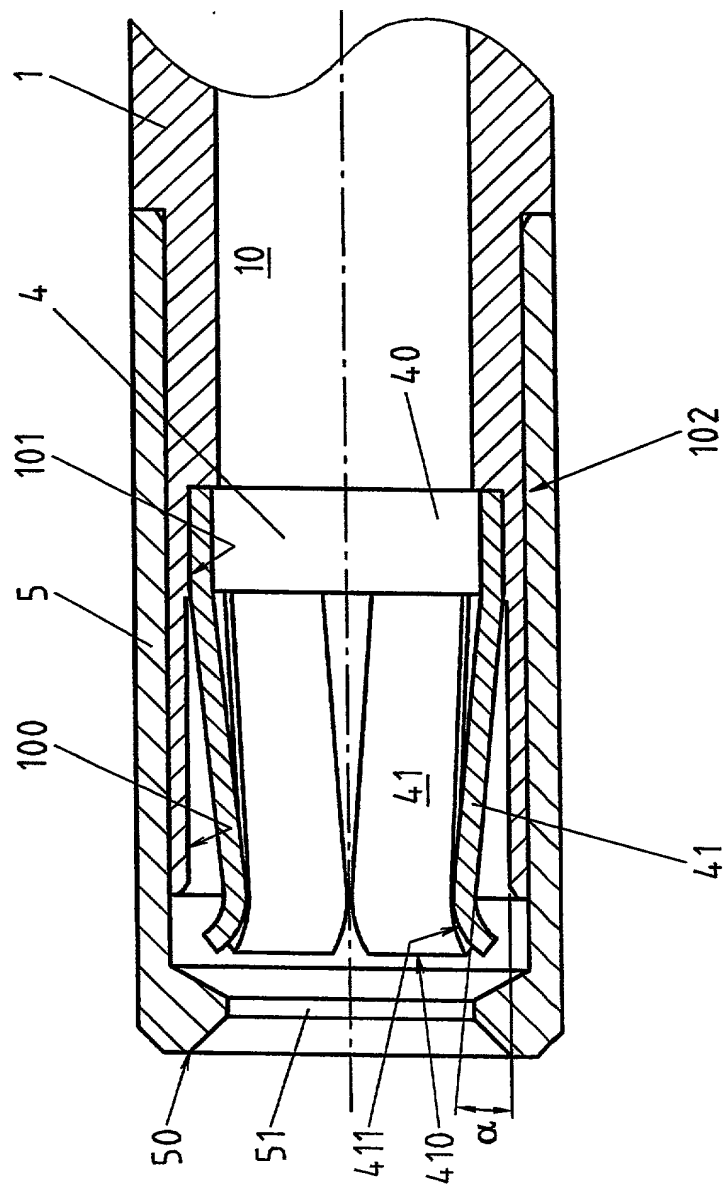


Fig. 3A

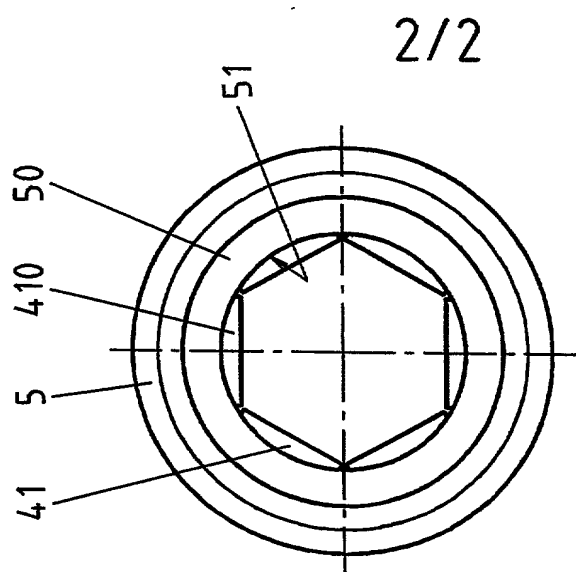


Fig. 3B

APPLICATION FOR UNITED STATES PATENT DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Contact piece

described and claimed in the specification:

Check one:

- *a. ☒ attached hereto
b. ☐ filed on _____ as Application No. _____ And amended on.....(if applicable)

I hereby state that I have reviewed and understand the content of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

Under Title 35, U.S. Code § 119, the priority benefits of the following foreign application(s) and/or United States provisional application(s) filed within one year prior to this application are hereby claimed:

Europe November 30, 1999 99811102.5

The following application(s) for patent or inventor's certificate on this invention were filed in countries foreign to the United States of America either (a) more than one year prior this application, or (b) before the filing date of the above-named foreign priority application(s) and/or United States provisional application(s):

None

I hereby appoint the following as my attorney of record with full power of substitution and revocation to prosecute this application and to transact all business in the Patent Office:

James A. Oliff, Reg. No. 27,075; William P. Berridge, Reg. No. 30,024;
Kirk M. Hudson, Reg. No. 27,562; Thomas J. Pardini, Reg. No. 30,411;
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Mario A. Costantino, Reg. No. 33,565; and Caroline D. Dennison, Reg. No. 34,494.

ALL CORRESPONDENCE IN CONNECTION WITH THIS APPLICATION SHOULD BE SENT TO OLIFF & BERRIDGE, PLC, P.O. BOX 19928 ALEXANDRIA, VIRGINIA 22320, TELEPHONE (703) 836-6400.

I hereby declare that I have reviewed and understand the contents of this Declaration, and that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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*If Box (a.) is checked, this form may be executed only when attached to the specification (including claims)

**Note to Inventor: Please sign name exactly as it appears above and insert actual date of signing.

IF THERE IS MORE THAN ONE INVENTOR USE PAGE 2 AND PLACE AN "X" HERE